

# THE WESTERN SPINY-TAILED SKINK, *EGERNIA STOKESII* BADIA: DECLINING DISTRIBUTION IN A HABITAT SPECIALIST

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## ABSTRACT

The Spiny-tailed or Gidgee Skink, *Egernia stokesii*, has two western subspecies; one of which, *Egernia stokesii badia*, has declined in distribution and abundance because of habitat disturbance and is currently listed as threatened. This study examined all known locations of *E. s. badia* in the Western Australian Wheatbelt to determine its current status. Results show that it is still found over a large part of its previously known range in the eastern part of the northern Wheatbelt, but it has declined or disappeared from most localities in the central Wheatbelt. Reintroduction to previously occupied sites from populations occupying threatened localities (abandoned buildings, farm sheds, etc.) could be undertaken if suitable habitat (e.g. old hollow logs) is established or available at translocation sites and members of family groups are relocated together.

## INTRODUCTION

The Spiny-tailed Skink or Gidgee Skink, *Egernia stokesii* (Gray 1845), is a large, stout, live-bearing skink up to 28 cm long with short dorsal spines and longer tail spines. It has several geographically separate and morphologically distinct populations and currently two subspecies are recognized in Western Australia (Aplin and Smith 2001). The nominate subspecies, *E. s. stokesii*, occurs on

islands in the Pelsaert and Wallabi Groups, Houtman Abrolhos, and on Useless Loop in Shark Bay, while the distribution of *E. s. badia* (Storr 1978) is focussed in the central and northern Wheatbelt with two known outlying localities in the central Carnarvon Basin and populations on Dirk Hartog Island and near Denham in Shark Bay. A previously recognized third subspecies in Western Australia, *E. s. aethiops* (Storr 1978), described from

Baudin Island in the Freycinet Estuary, appears most closely related to the nominate *E. s. stokesii* and has been synonymised with it by Aplin and Smith (2001) who examined all recent collections of the species from Dirk Hartog Island, Edel Land and Peron Peninsula in the Shark Bay region. The disjunct populations of *E. stokesii* in central southern and eastern Australia are occasionally referred to as a separate subspecies, *E. s. zellingi*.

An unusually dark coloured specimen, currently recognized as *E. s. badia*, has been collected from Woolgerong Rock that lies well inland of all other records. A similar individual has also been sighted at a breakaway 4 km east of Yalgoo (G. Harold pers. comm.). These may represent yet another regionally distinct form of *E. stokesii*.

While the island populations of *E. s. stokesii* on the Houtman Abrolhos remain numerous within their restricted ranges, the mainland *E. s. badia* has suffered a major decline over the past century as a consequence of land clearance, especially in the central Wheatbelt (Storr *et al.* 1999). *Egernia s. badia* is currently listed as "fauna that is rare or is likely to become extinct" in the Wildlife Conservation (Specially Protected Fauna) Notice 2001 (Government of Western Australia 2001) and placed in the 'endangered' category, but at the time of this survey in 1998 was believed to be 'critically endangered'.

The biology of *E. stokesii* is relatively well understood due to the recent work of Bull and co-

workers with literature reports detailing their occurrence in small groups (Gardner *et al.* 2001), their diet (Duffield and Bull 1998), production of live young and their preferences for hollow logs and rocky outcrops where they are active during the day (Greer 1989). It is also very likely that individual *E. stokesii* have a potential longevity in the order of several decades. Of particular significance, however, is the behaviour of several *Egernia* species, including *E. stokesii*, in depositing faecal droppings in a concentrated cluster outside their refuges (Cogger 1992, Wilson and Knowles 1995, Greer 1989, Pearson pers. comm.). These distinctive droppings have been used to determine the presence of this species during faunal surveys.

This paper reports on an assessment of the status of *Egernia stokesii badia* in the central and northern Wheatbelt region until the end of 1998.

## METHODOLOGY

The past and present distribution of *E. s. badia* was investigated through consideration of all known localities of museum specimens and unpublished data, and current field surveys. During current surveys information on surviving populations of *E. s. badia* was sought from members of the community through approaches to both amateur herpetologists and local farmers.

Field surveys were undertaken to assess the current status of *E. s. badia* within the central and northern Wheatbelt region,

focussing on previously known collecting localities and any major unsampled woodlands within the known core distribution area of the species. During searching of likely habitats, particular use was made of the previously mentioned behavioural trait of the species in leaving faecal piles outside occupied logs and stumps. Presence of fresh faecal piles was taken as evidence of the species persistence in an area, and old faecal piles were taken as evidence of its presence in the recent past.

## RESULTS AND DISCUSSION

### WA Museum data

The WA Museum has specimens from 28 localities in the northern and central Wheatbelt region. The date of collection of these

specimens is presented graphically in Figure 1 with the first record being in 1917. All of the 28 locations where *E. s. badia* has been recorded in the Wheatbelt (except Rothsay) lie within the "Avon Wheatbelt" IBRA bioregion of Western Australia (Thackway and Cresswell 1995). The majority of these collecting locations are from bushland reserves associated with the railway sidings established to handle harvested grain crops. One record from Hampton Hill, 25 km east of Kalgoorlie, from 1930 is believed to be that of an individual moved there during the period of extensive timber transport to the Goldfields for mining; no recent records have been made in this region.

There has been a marked decline in the number of specimens accessioned into the collections of

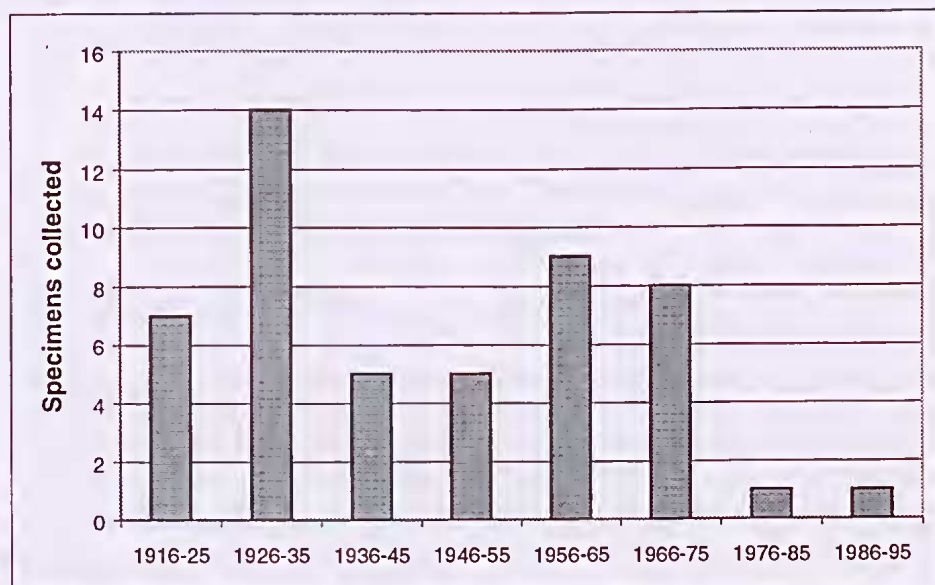


Figure 1. Decade of collection of specimens of *E. s. badia* lodged in the Western Australian Museum.

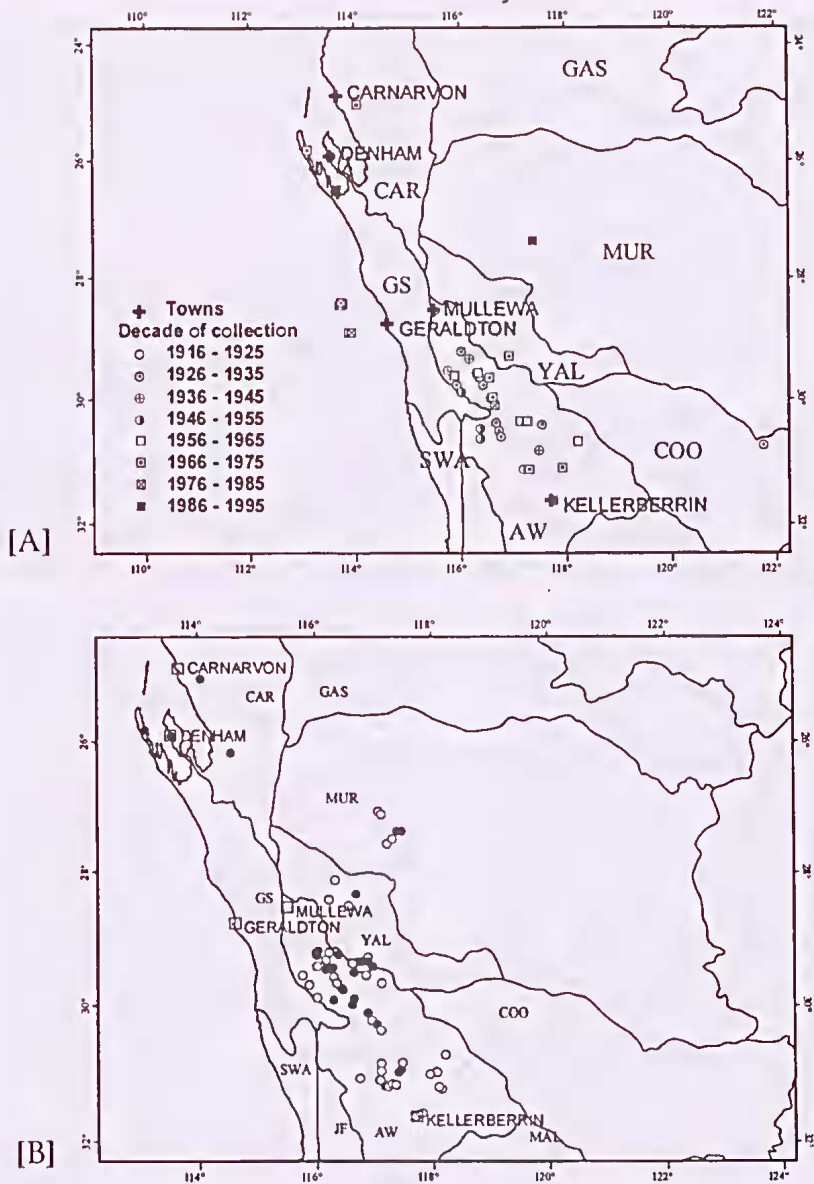


Figure 2. [A] Distribution of *E. stokesii* as represented by specimen localities from the Western Australian Museum and identified by decade of collection. [B] Distribution of *E. s. badia* as determined from recent field surveys by the authors and other herpetologists between 1996 and 2000. Closed circles represent extant populations, open circles locations without evidence of *E. s. badia*. Principal towns and IBRA regions are identified; AW Avon Wheatbelt, CAR Carnarvon, COO Coolgardie, GAS Gaseoyne, GS Geraldton Sandplains, JF Jarrah Forest, MUR Murchison, SWA Swan Coastal Plain, YAL Yalgoo.



the Western Australian Museum over the past 25 to 30 years. This fact, coupled with the large scale clearance of vegetation in the region in the past 40 years, has raised concern as to the long term survival of the subspecies in the Wheatbelt part of its distribution and led to its ranking as 'critically endangered' and listing as "rare or likely to become extinct" (Western Australian Government 1997).

The location of all collection sites of *E. s. badia* specimens in the WA Museum collection are presented in Figure 2a together with the distribution of specimens of *E. s. stokesii* and the unusual Woolgerong Rock colour form.

The locality of Caron, south of Perenjori, with six specimens has provided the greatest number of individuals in the collection of the WA Museum, while numerous other locations in the Wheatbelt have been the source of more than one specimen.

During the 1970's, the WA Museum surveyed 23 reserves throughout the Wheatbelt (Kitchener *et al.* 1980). This species was encountered on only one of these reserves. Over the last decade, one definite sighting has occurred in the northern Wheatbelt region – an adult in a small reserve near Mullewa (B. Maryan pers. comm.).

The central Carnarvon Basin population is poorly known, with only two definite localities (Callagiddy and Woodleigh Stations). The species was not encountered during the Carnarvon Basin Biological Survey during 1995–1996 (McKenzie *et al.*

2000) but, subsequently, has been seen on Woodleigh Station (B. Maryan pers. comm.). This northern population of *E. s. badia* may well be disjunct from that in the Wheatbelt.

### Field Survey Results

We conducted field surveys in January, April and June 1998 to determine the current status of *E. s. badia* populations in the central and northern Wheatbelt of Western Australia. Over 80 locations within the Shires of Yalgoo-Mt Magnet, Three Springs, Carnamah, Perenjori, Morawa, Coorow, Moora, Dalwallinu, Wongan-Ballidu, Koorda, Dow-erin, Mt Marshall, Wyalkatchem, Trayning, Kellerberrin, Nungarin, and Merredin were examined. These areas ranged in size from over 400 ha to less than one hectare.

The presence or otherwise of the species was determined by observing characteristic faecal piles outside hollow refugia or actual observation of individuals. The locations examined for *E. s. badia* are presented in Figure 2b with presence of the species denoted by closed circles and a suspected absence by open circles.

In 1972, a WA Museum survey team documented the presence of this species on Buntine Nature Reserve (No. 26837) and a specimen had been collected from Buntine in 1953. This Nature Reserve was re-examined in January 1998 and a single individual was captured in a hollow Gimlet (*Eucalyptus salubris*) log at the 1972 capture locality (Loc 1.5, Kitchener *et al.* 1979). An

hour-long survey at this site in January 1998 revealed six other logs or log piles in Gimlet/Salmon Gum (*E. salubris*/*E. salmonophloia*) woodland with fresh faecal deposits. It appears that a healthy population still persists at this location on Buntine Reserve.

Two other individuals were collected during our 1998 surveys, one from a large log in York Gum (*Eucalyptus loxophloeoba*) woodland on Bowgada Nature Reserve, the other from under disused railway sleepers in the Perenjori township. In addition, four individuals were marked and released from another colony under a woodpile in the backyard of a house at Perenjori.

The mummified skeleton of a hatchling *E. s. badia* was collected from under logs in York Gum woodlands south of Rothsay, while another mummified large adult was obtained from under a York Gum log adjacent to an abandoned farmhouse east of Morawa on the Yalgoo road. Skeletal remains of *E. s. badia* were collected within two faecal piles in York Gum woodlands; one east of the Wheatbelt and the other from a bushland remnant in a wheat paddock east of Wubin.

A captive colony, maintained at the Perth Zoo, of *E. s. badia* were all derived from a colony in an abandoned house just south of Perenjori (Russell Trehair, Perth Zoo, pers. comm.).

A four-day survey of woodlands and rocky outcrops north of Morawa and into the Mt Magnet Shire was undertaken to follow up locations of both typically patterned and 'melanic' *E. s. badia*. This survey failed to locate

previously documented 'melanic' populations of the species from a breakaway 4 km east of Yalgoo and at Woolgerong Rock (G. Harold pers. comm.). Ten other locations were also examined for this unusual colour morph of *E. s. badia*. Four adult 'melanic' *E. s. badia* were observed by Russell Brown, two were seen deep in a single granite crevice on Woolgerong Rock and the others in separate crevices on Wurrah Rock. All the crevices were large and horizontally orientated with associated basking ledges. Skink faeces were noticed only outside one Wurrah Rock crevice.

A detailed survey of Woolgerong and Wurrah Rocks was undertaken in late June 1998 by herpetologists Brad Maryan, Robert Browne-Cooper and Brian Bush. This survey was initiated to gather further information on the habits and habitats of the 'melanic' form of *E. s. badia* and to obtain a specimen for molecular studies. A total of eight hours was spent searching the Rocks, resulting in the collection of a single adult. This specimen was collected from a crevice high on Wurrah Rock with both the crevice and basking ledge facing east. Faeces were collected from a deposit on the basking ledge. The remaining crevices were at the base of the rock. A search of Ulogunna Rock the following day failed to indicate the presence of *E. s. badia*.

#### *Surviving Populations*

The collection of individuals or skeletons of *E. s. badia* from Buntine Nature Reserve, Bowgada

Nature Reserve, Perenjori town and in York Gum woodland south of Rothsay and northeast of Morawa indicate that the species is still located over a large part of its previously known range in the eastern part of the northern Wheatbelt. Similarly, the recording of recent faecal piles adjacent to refuges in hollow logs at a further 10 *Eucalyptus* woodland sites as far south as Kalannie indicates that active colonies persist at numerous locations throughout part of the previously known range of *E. s. badia*.

However, none of the sites examined in the central Wheatbelt in the Shires of Dowerin, Mt Marshall, Wyalkatchem, Trayning, Kellerberrin, Nungarin, and Merredin revealed any current presence of this species. These sites included over a dozen localities from where specimens had been previously collected.

All of the sites where *E. s. badia* was recorded confirmed the assertions by previous authors that one of the species' preferred habitats was hollow logs. Most of the occupied sites were in York Gum woodland, although some were also in Gimlet and Salmon Gum woodlands. In all of the woodland sites surveyed the species occurred only where there were considerable numbers of large fallen logs over 25 cm in diameter. Preferences appeared to be for log piles where several overlapping hollow logs provided numerous openings as well as cover.

Assessment of the size and number of pellets in faecal deposits indicated that the

populations with the greatest number of individuals were those associated with areas where suitable logs were abundant and grazing by domestic stock was least. Dispersal of young between logs may be disrupted by the presence of cattle or sheep, such that the long-term survival of populations in grazed woodlands may not be assured.

Two traverses east of Perenjori, through wheatfields into uncleared land, indicated that *E. s. badia* can persist in very small remnants of York Gum woodland surrounded by shrublands. The species persists in woodlands as small as 1 ha, although several other small (< 5 ha) patches failed to show evidence of their persistence. York Gum woodlands surrounded by wheatfields also retained populations of *E. s. badia*. Farms in the Perenjori shire retain populations of *E. s. badia* in old abandoned farmhouses, sheds and woodpiles (D. Robinson unpublished).

The continued persistence of the species in York Gum woodlands represents the best prospects of survival over part of its former range. Reintroduction to sites where the species occurred previously is a feasible proposition. Populations occupying "threatened localities" (abandoned buildings, farm sheds etc.) could be translocated provided suitable habitat (eg old hollow logs) is established at translocation sites and taking into consideration the social family structure of the species (Gardner *et al.* 2001).

The discovery of *E. s. badia* populations in York Gum wood-



land east of the cereal growing areas is of major conservation significance. This is an extension of the previously known distribution into the Yalgoo IBRA region. It is also significant that a 'melanic' form of *E. s. badia* is distributionally disjunct from the typical form and occupies rock outcrops rather than woodlands. This population warrants further investigation to determine its genetic and conservation status.

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